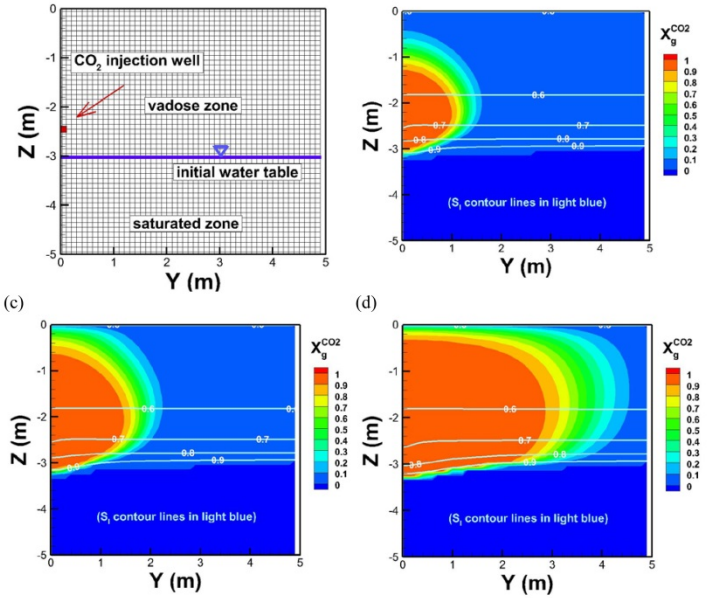
EOS7CA Version 1.0:

Equation of state module for water, air, and CO_2, CH_4, or N_2 in shallow subsurface systems

- **Shallow CO_2 migration (e.g., leakage from GCS sites)**
- **Methane leakage (e.g., from buried pipelines)**
- **Biogenic methane or CO_2 generation and migration**



Overview:

EOS7CA is a module for mixtures of a non-condensible gas (NCG) and air with or without a gas tracer, an aqueous phase with or without brine, and water vapor. The user can select the NCG as being CO_2, N_2, or CH_4. EOS7CA uses a cubic equation of state with a multiphase version of Darcy's Law to model flow and transport of gas and aqueous phase mixtures over a range of pressures and temperatures appropriate to shallow subsurface porous media systems. Transport of the gaseous and dissolved components is by advection and Fickian molecular diffusion.

EOS7CA can be ordered from LBNL's TOUGH website

https://tough.lbl.gov/software/

(all royalties from TOUGH *software sales are used to further the development, testing, and documentation of the TOUGH codes)*

Developers:

Curtis M. Oldenburg, George J. Moridis, and Matthew T. Reagan
Energy Geosciences Division 74-316C, Lawrence Berkeley National Lab
University of California, Berkeley, CA 94720
Contact: cmoldenburg@lbl.gov

User Guide:

Oldenburg, C.M., EOS7CA Version 1.0: TOUGH2 Module for Gas Migration in Shallow Subsurface Porous Media Systems, Lawrence Berkeley National Laboratory Report LBNL-175204, March 2015.

Peer-reviewed articles based on EOS7CA:

Oldenburg, C.M., J.L. Lewicki, L. Pan, L. Dobeck, and L. Spangler, Origin of the patchy emission pattern at the ZERT CO_2 release test, *Env. Earth Sci.*, 60(2), 241-250, 2010. *LBNL- 3063E.*

Oldenburg, C.M., J.L. Lewicki, L. Dobeck, and L. Spangler, Modeling gas transport in the shallow subsurface during the ZERT CO_2 release test, *Transport in Porous Media*, *82*(1), 77-92, 2010. *LBNL-1529E*.

Lewicki, J.L., C.M. Oldenburg, L. Dobeck, and L. Spangler, Surface CO_2 leakage during two shallow subsurface CO_2 releases, *Geophys. Res. Lett.*, 34, L24402, 2007. *LBNL-63528.*

November 2018